

**The Future of Telehealth Reimbursement: A Policy Analysis of Remote Patient Monitoring
in Intensive Care Units**

by

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Abstract

Telehealth has been one of the most revolutionary changes in modern medicine. It is the virtual exchange of real-time data to provide care for a patient, even when a caregiver is not in the same physical location. It has been a growing application of technology in healthcare for years, but its growth has recently been accelerated due to the COVID-19 pandemic. COVID-19 has required innovative solutions for issues like monitoring infected patients from afar and keeping up with providing routine screenings. Leveraging telehealth has allowed patients to receive attention from a provider without being near one and has allowed providers to monitor COVID-19 patients from a safe distance.

Telehealth was not immediately widely adopted because of the reimbursement policy associated with it and the implementation costs. In general, telehealth has been reimbursed at a level significantly below that of traditional care, if at all, and that is especially the case for tele-ICUs. The current standard policy around tele-ICUs does not encourage an investment in the technology. This essay examines the costs and benefits associated with use of tele-ICUs through a literature review and analyzes how a change in policy can have public health significance, impact stakeholders, and supplement healthcare in the US.

Tele-ICUs have the potential to be valuable and can be more sustainable in the long term than current options for intensive care. They have already shown potential to impact costs, patient

outcomes, patient access, average length of stay, and more. While the literature does reveal reasons to be skeptical and a need for future studies, tele-ICUs could be the way to supplement intensive care medicine moving forward. Once the country moves past the COVID-19 public health emergency, it will be essential for the government to consider the contributions that tele-ICUs have made in the medical community and pass new policies encouraging continued implementation of them. Doing so will not only help improve care but also significantly impact public health and health equity.

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Preface

I would like to thank Dr. Evan Cole for his support and guidance as my essay advisor throughout this entire process. His ability to provide insightful feedback and words of encouragement played a major role in the completion this essay. I would also like to thank Dr. Martha Ann Terry and Dr. Coleman Drake for the commentary and direction they each gave throughout this project. Additionally, I would like to thank my roommates who have been so encouraging and supportive and have done their part in ensuring I take some time to live life. Finally, I would like to thank my parents, Jack and Kim, and my sister, Ellie, for their continued love and support throughout my academic endeavors.

1.0 Introduction

Telehealth has historically been a broad term for medical services provided via telecommunication. There have typically been three methods of providing these services to patients. The first is synchronous care involving real-time, direct communication between a patient and provider. The second is asynchronous care, which is the use of a patient portal, sending emails, messages, or other information via devices. Lastly, remote patient monitoring (RPM) is when patient data is acquired at one location and sent in real-time to a healthcare provider in a separate location (CCHP, 2022). The broad range of telehealth encompasses the more clinical term telemedicine, which at the Centers for Medicare and Medicaid Services (CMS) is when medical information is exchanged across sites via telecommunication to work toward improving a patient's health (CMS Snapshot, 2021). In this analysis, telehealth policy will encompass telemedicine policy. Also, tele-ICU care will refer to telemedicine care that is provided by a combination of synchronous care and RPM of patients in an ICU in a location different than that of the physician. The primary physician will be located in a central command room either in the same hospital or a different hospital.

Many people picture videoconferencing with their doctor when thinking of telehealth, but a newer method that can make a substantial impact on the world is the use of RPM in tele-ICUs. Telehealth has been utilized for quite some time, and the use of tele-ICUs has been around for about 25 years (Breslow, 2007). Nearly two-thirds of hospitals utilize some form of RPM (AHA, 2019), but that number is less for those utilizing it in the ICU. Utilization of tele-ICUs can not only potentially increase the quality of care that all patients receive, but also play a significant role in expanding health equity and access to care (Harriott & DeVita, 2014). Various studies show the

potential benefits that can come with the introduction of a tele-ICU, but there are potential risks as well. These can include equipment malfunctions, increased mortality and length of stay (LOS), and more. With that said, further evaluation is needed to determine what can be done to help people in the most efficient way possible.

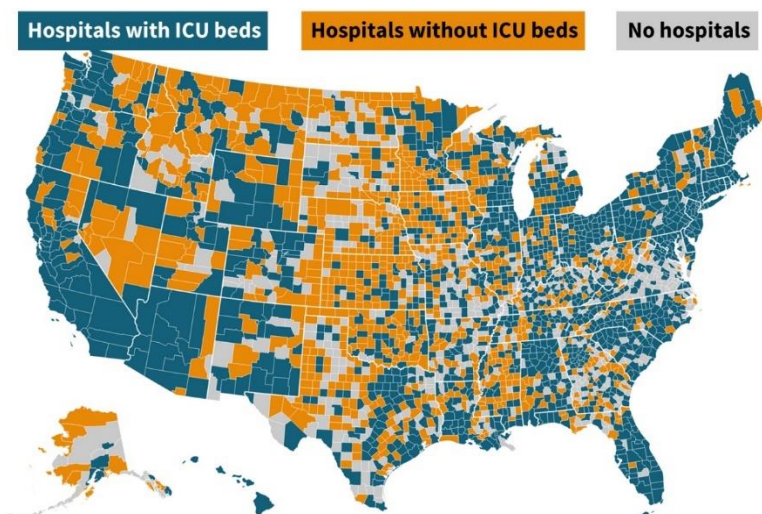
Overall, this essay will explore the clinical data and health policy principles for tele-ICUs. It will then analyze the policy surrounding telehealth and telemedicine to make a recommendation for next steps. To do so, it will first discuss general policy background, the overall policy issue, and a review of relevant literature. Then it will provide a stakeholder analysis along with the current policy options. Finally, it will propose potential strategic options and future public health implications.

1.1 The Need for Innovation

As the aging population in the United States (US) continues to grow, the demand for medical care will as well. In fact, the US Census Bureau projects that the number of citizens over 65 years old will be approximately 82 million and that number will continue to climb. The issue then becomes, will the country be able to keep the supply equal to the demand? As of now, the answer is no. According to the American Association of Medical Colleges (AAMC), the US could be facing a physician shortage in both primary and specialty care of anywhere between 37,800 and 124,000 by 2034 (AAMC, 2021). The gap could grow even more quickly as physician burnout increases, especially due to the pandemic. While this statistic has a more significant impact on primary care, critical care will also be affected and strained. With an aging population, the country will continue to see the average daily ICU census rise and any type of staffing shortage will be

felt. This will especially be seen in areas that have less physicians in general. An important situation noted by Kaiser and seen in Figure 1 is that counties that have hospitals but no ICU are home to 18 million people and about 4.5 million of them are at least 60 years old. Additionally, almost 11 million more people, of which 2.7 million are seniors, do not have a hospital in their home county (KHN, 2019).

Figure 1. Where the ICU Beds in the US Are Located



2018-2019 Map of Counties with ICU beds and those without ICU beds (KHN, 2019).

The physician shortage will certainly impact care for all, but it will have the greatest impact on low-income areas that have experienced sustained hardship. It will also disproportionately affect those in rural areas without the proper care facilities. This will especially be realized as the reduced number of physicians opt to pursue high paying positions in large cities rather than rural areas. Both numbers mentioned show an opportunity for technological efficiency to modernize the care patients receive in rural areas. Tele-ICUs can be a solution for both the physician shortage and access to care issues that so many Americans are impacted by. This telemedicine design can

address numerous coverage gaps and profoundly change the way critical care is delivered in rural areas.

Another important note is the increasing nursing shortage. The nursing profession is one that has an aging workforce that is expecting to see a high number of retirements in the next 10 to 15 years, given the average nurse's age is about 50 years old (Haddad et al., 2021). Projections indicate that the nursing shortage will continue to be an issue in all specialties, and this will be important for the quality of care that is able to be provided. Nurse to patient ratios have already been growing and this has been a problem in the critical care setting. With regards to a tele-ICU, a nursing shortage is an important factor but one that will not be addressed as much as a physician shortage would be. Nurses will still be on site at a tele-ICU and providing in person care while fewer physicians will be needed on site.

It is essential to have a plan to leverage technology to create solutions and provide the best care possible to all people. A tele-ICU system will allow for collaboration between providers that improves the quality of care for all patients locally no matter where they are, and it will help supplement nursing care by being able to constantly monitor intensive care patients, taking some of the pressure off nurses. It has been noted that only 1% of the ICU beds in the country are located in rural counties, while 19% of Americans live in these counties (Davoodi, Healy, & Goldberg, 2020). With that, hospitals could in theory simply implement tele-ICUs right now to provide equitable care to the community while also increasing their revenue streams. That is not what happens though. This begins to get into the systemic issues at hand and is where there is opportunity for new reimbursement policy.

Moving forward, the introduction of policies that encourage the utilization of tele-ICUs can potentially help the United States to improve care and the access to it, while also reducing

costs. Some payors are beginning to reimburse more willingly for tele-ICU care, but CMS is said to be lagging behind, according to stakeholders like the American Hospital Association (AHA). The position of the AHA is that the further expansion of telehealth services is being impeded by limited Medicare coverage (AHA, 2019). Currently, CMS policies are in place supporting telehealth as a whole, but they only extend until the end of calendar year 2023 (CMS Fee Schedule, 2022). The following data and analyses will show how important it will be to extend those policies indefinitely and the impacts that building upon them can make.

2.0 Background

2.1 History of Telehealth

Only recently telehealth has become a common practice. The first mention of telehealth came just over 100 years ago as physicians spoke of utilizing a telephone to reduce unnecessary office visits (Nesbitt, 2012). Telehealth began to be utilized in the community and patients' homes as the 20th century progressed, thanks to numerous technological advancements. This also led to the eventual use of telemedicine in clinical settings. Physicians were able to send test results and imaging to another office and receive an appropriate consultation without having to wait.

This ultimately led to the introduction of hospital-based telehealth in the late 1950s. Perhaps the most notable early use of inpatient telehealth was for psychiatric consultations on a closed-circuit link between Nebraska Psychiatric Institute and Norfolk State Hospital in Nebraska (Nesbitt, 2012). As healthcare providers began seeing the benefits of telemedicine in caring for patients and the increasing capabilities of technology, use of telehealth really began to expand. Some of the newest applications of technology to medicine currently include robotic telesurgeries controlled by physicians thousands of miles away, telehealth prescription drug distribution, and remote patient monitoring via tele-ICUs. Each of these healthcare innovations has already made an impact on society and will continue to do so.

2.2 History of Telehealth Policy

Reimbursement policy for telemedicine and telehealth in general has been historically limited. Before the COVID-19 pandemic began, CMS paid for telehealth only in certain instances. The rule through Medicare was that in order for a patient to be covered, they must live in a rural area and commute to a medical facility to receive services from a physician in a different location (CMS Trump, 2020). Then in 2019, Medicare started paying for short interactions between a provider and a patient in any type of geographic location, so long as the interaction was initiated by the patient, which helped expand access to care for underserved populations (CMS Trump, 2020). The importance of such expansion was recognized and has been one of the factors leading to the continued expansion today. Besides enabling a safer way for older Americans to receive care, it has also provided expanded access in general by allowing patients to have telehealth visits in their home.

Tele-ICU reimbursement from CMS has typically not been available. According to Kruklitis et al., providers barely received a small level of direct reimbursement, if any, for tele-ICU care as of 2013. In fact, tele-ICU care has been denied coverage by CMS multiple times. The current procedural terminology (CPT) codes 99291 and 99292 are typically utilized for patients in critical care. The code 99291 is for the first 30-74 minutes of care provided, while 99292 is for each additional 30 minutes of care (CMS Regulations, 2014). According to the US Government Accountability Office (GAO) report, CPT codes 99291 and 99292 were previously considered for telehealth coverage and denied in 2009, 2010, 2012, and 2016 because critical care services are not similar to any services on the current list of Medicare telehealth services, and CMS believes patients requiring critical care services are more acutely ill than typical patients receiving telehealth services. Additionally, CMS did not have evidence that these services provided via

telehealth are equivalent to in-person services. In 2016, CMS did not find that the submitted evidence demonstrates a clinical benefit to the patient (GAO, 2017).

Once the COVID-19 public health emergency began, CMS expanded use of the critical care CPT codes to include telehealth services (CMS Fee Schedule, 2021). These codes had previously required that time be spent caring directly for the patient at their bedside, or at least somewhere within close proximity to the patient. Now, CMS has opted to allow these codes to also cover remote patient monitoring of care, as long as a full spectrum of care capabilities is available. This includes the ability to review lab results in real time, discussing the patient's care with another physician, and speaking with a patient and their family. The main key is that time must be entirely focused on one individual patient.

The technological requirements of a typical tele-ICU include a layered system of AV communication, telemetry, imaging systems for documentation and data retrieval, EMR access, and the availability of risk stratification and decision support (Nesbitt, 2012). In addition, information management and security are vital pieces of a system. These allow for the best communication between a physician and the patient, or patient's family, which is key. Having all these capabilities is essential, but it can be quite expensive.

Now that policies have been adjusted temporarily, it creates an opportunity to showcase how much of an impact tele-ICUs can have on the care a hospital can provide. Numerous telehealth reimbursement policies from CMS are in place until at least 2023, but the pandemic will not last forever. It is essential that the government recognizes the significant role that these policies have played and how they can impact care moving past COVID-19.

2.3 Literature Review

The recent changes in telehealth reimbursement policy have created an opportunity to display the impact that tele-ICUs can provide. Numerous technological advancements have occurred since the conception of tele-ICUs that have improved the quality of care and expanded their capabilities. Since their beginning, studies have been conducted to evaluate the level of quality these tele-ICUs can provide, as well as costs or costs savings associated with them. A brief review of literature around tele-ICUs shows how they work to improve long-term costs, patient access, and patient outcomes like ALOS and mortality. After reviewing some of the literature, it is clear that tele-ICUs have the potential to be an option to address some of the critical issues for intensive care moving forward.

Since the mid-2000s, a number of studies have examined the effectiveness of tele-ICUs in reducing important hospital metrics. One study was conducted by Dickhaus et al. in the early 2000s that included two community hospitals after their implementation of tele-ICUs. The study examined the usage of intensivists across different states using telemedicine and observed a decrease in mortality along with a decrease in ALOS of about 17% (Dickhaus, 2006). While these changes may not be large, many would agree that any beneficial change in mortality and ALOS has potential to be worth additional costs. This study was notable because it was one of the first to show the potential of tele-ICUs.

Another example of research done on tele-ICUs comes from a study at the University of Massachusetts. The research done by Lilly et al. at UMass between 2005 and 2007 examined the effects that the introduction tele-ICU capabilities would have on mortality and ALOS. The study included over 6,200 adults in those two years in both the pre- and post-intervention periods. The study found a 1.8% decrease in mortality for the ICU and a reduction in ALOS by 3.5 days. It also

found an increased rate of adherence to best clinical practices and a reduced rate of preventable complications (Lilly et al., 2011). Another study performed by Lilly et al. in 2014 supported these findings as well. In this study, the authors increased the sample size drastically, including over 118,000 patients from across the country. Overall, the findings of this study included reduced mortality for patients in the tele-ICU setting and reduced ALOS for patients in the ICU and in the hospital in general. These findings were associated with the timely use of performance data, quicker responses to alarms, and better adherence to best practices that come with the implementation of a tele-ICU (Lilly et al., 2014). These metrics demonstrate the potential that tele-ICUs have to make an impact.

While these two studies exhibited positive results at a few different locations, these findings remain consistent when looking at just one single community hospital ICU. In the study done by Sadaka et al., they witnessed a statistically significant decrease in both severity of illness adjusted mortality as well as ALOS. In fact, the ICU mortality dropped from 7.9% to 3.8% (Sadaka et al., 2013).

The previous studies mentioned primarily focused on a smaller sample size of beds, but there are also examples with a larger sample size. Zawada et al. conducted a study featuring one large tertiary hospital, three rural hospitals, two community hospitals, and nine critical care centers. In this examination of 15 different locations, the findings remained consistent with those mentioned previously. Zawada et al. witnessed an adjusted mortality rate that ranged between a 29% reduction and no change, as well as an ALOS reduction that ranged from 45% to 22.5% (Zawada et al., 2009).

One additional example that is important to consider comes from Morrison et al. This study examined two community hospitals in Chicago, and it is much different than the previous ones

listed. The study involved over 4,000 individuals in the ICU and found no significant change in ALOS, mortality, or cost (Morrison et al., 2010). An important sidenote though is that ALOS increased over time and was associated with higher tele-ICU utilization, while as total hospital costs increased over time, the increases were greatest for patients who were not permitted as much tele-ICU care by their physicians. These results portray why additional study is needed and the potential that tele-ICUs have. Similar results to the main findings have also been seen in a few other studies like that from Thomas et al. in 2009, which also found no association of improvement in ALOS or mortality with tele-ICU use. This is important because sometimes tele-ICUs provide great care and beneficial results, and sometimes there is no significant change in the care provided. With that though, studies do mostly indicate that tele-ICUs do not increase some of the negative metrics. While one cannot be certain of the exact impact that a tele-ICU will have, they can know that if utilized, they will provide much needed reliable care to an increased range of patients.

One final piece of support for this comes from a systematic review performed by Vranas et al. in 2018 that gives a more wholistic look at the implementation of tele-ICUs and how they can impact care. The major takeaway from this paper is that out of all 12 studies included, not one exhibited a negative result. Most exhibited some combination of a reduction of mortality, ICU complications, ALOS, and other metrics, but none showed an increase in these metrics (Vranas, Slatore, & Kerlin, 2018). These findings were not due to any stated omission of certain studies, rather they were just what had been observed. This speaks to the level of care that these programs provide and to the opportunity they present. This article also speaks to the importance of the tele-ICU being in the right environment for success and the important role that cost plays.

Additionally, studies have examined the costs or cost savings that are associated with the implementation of a tele-ICU. One study by Rosenfeld et al. in 2000 pointed out that tele-ICUs

have the potential to reduce costs while also leading to improved hospital metrics. It noted that costs were reduced by about one third (Rosenfeld et al., 2000). Another example noted a reduction in variable costs per case and higher revenues due to an increase in patient volume (Leong, Sirio, & Rotondi, 2005). While the authors noted that there are additional factors that could have played a role in these findings, such as new computer systems and decision support tools, this study does show that there is great potential, as long as the right help is given. One study that showed potential risk associated with costs was from Kumar et al., as mentioned earlier. They detailed the potential for an average cost of up to \$5,600 per patient (Kumar et al., 2013). This indicates that despite all the positive data associated with tele-ICUs, more research is necessary to make a final determination as to the effectiveness of them. Implementing new policy will help to give that a chance.

Taken together, the literature finds that tele-ICUs are an efficient way to supplement intensive care and they can be helpful in addressing public health issues like the physician shortage or rural access to care moving forward. The research shows that tele-ICUs can work to reduce costs and improve outcomes by reducing the risk of complications. Given the cost that has been seen to be associated with implementation of them though, new reimbursement policy is needed to ensure fair access to this type of care for all. This new policy will work to help close the gap in health equity and provide direction for future telehealth reimbursement.

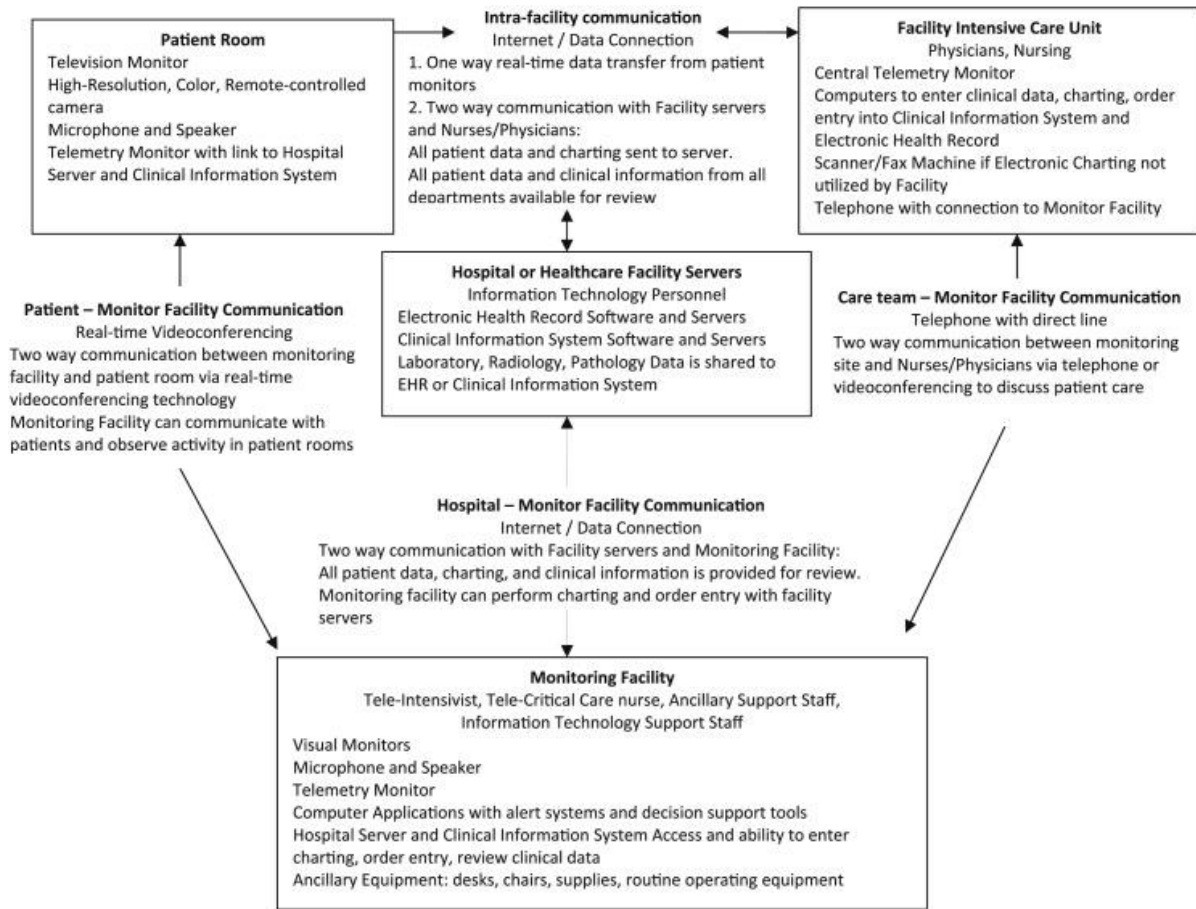
3.0 Statement of Policy Issue

Tele-ICUs are a viable method to increase access to care while ensuring that the quality of care is at the same level as, if not higher than, what is available in traditional ICUs. Utilization of tele-ICUs can help to decrease mortality, ALOS, and more as previously stated. A major factor preventing major usage in the US is the cost associated with them. When hospitals implement these new systems, a large capital investment is required but costs for the hospital do not always decrease. Even with reimbursement levels the same for tele-ICUs as traditional ICUs, the main beneficiaries of these tele-ICUs, besides the patients, tend to be the payors (Trombley et al., 2018). With such high initiation costs, the only hospitals that are able to afford to implement modernized systems are the ones where the current level of care is sufficient, like urban teaching hospitals, furthering the divide in health equity. Issues like the fact that some people are restricted to living in a specific zip code for their lives and then are subjected to a lower quality of healthcare and increased likelihood for additional morbidity highlight reasons why there is a need for policy change. New policy must be enacted to incentivize the implementation of tele-ICUs across the country and make them a beneficial tool for all parties and all people. It is also needed to allow for further exploration of cost-benefit analyses regarding different implementation methods of tele-ICUs to determine what works best.

3.1 Costs Associated with Tele-ICU Implementation

A basic tele-ICU operational structure contains numerous resources, including physical equipment needs, technological requirements, IT security, and much more. Additional details on what goes into a typical tele-ICU operational structure can be seen below in Figure 2. When examining this list, it is clear that expenses can rise quickly. Two of the first questions that any C-suite executive will ask after any pitch is, “How much will it cost?” and “What will we get out of it?” With that in mind, it is important to have an understanding of the costs of implementing a tele-ICU to understand why an incentive to start one is needed.

Figure 2. Generic Tele-ICU Operational Structure



Basic tele-ICU operational structure and detail of equipment (Kumar et al., 2013).

Various studies have been undertaken to assess the total costs associated with the implementation of a tele-ICU. As expected, the costs vary, depending on many of the decisions that hospital staffs make. In general though, multiple studies over the course of 20 years have found that costs for implementation and the first year of operation range from \$50,000 to \$100,000 per tele-ICU bed (Kumar et al., 2013). This can be a significant cost for a health system depending on the financial structure of the organization. In addition to the initial costs for setting up the tele-ICUs, hospitals must consider the staffing structure in place as well.

The initial costs associated with tele-ICU beds can be high, but they bring about the possibility of savings for both the hospital and the payors. To date, research has been mixed regarding the total net costs or savings that can be expected. It is possible to have significant cost reductions on a per patient hospitalization basis of up to \$3,000 or an increase in costs of up to \$5,600 (Kumar et al., 2013). Additionally, reduced morbidities, ALOS, readmissions, and other metrics likely reduce costs the payors face (Trombley et al., 2018). These possibilities could be impactful for a healthcare organization, but it is only possible for those willing and able to take the risk.

So far, many of the hospitals and systems that have implemented tele-ICUs have been wealthy, for-profit organizations or large non-profit urban teaching hospitals, while public hospitals and ones with a high Medicare/Medicaid payor mix simply cannot afford the risk. The high entry costs, coupled with the historically limited reimbursement present a barrier to this new healthcare solution that provides quality care to patients. This only continues to perpetuate the issues in health equity that are present in the US. Thus, a solution is needed to address this problem. Until something is done, the gap in the quality of care between individuals of different socioeconomic statuses will only continue to grow. Hospitals need motivation to implement this innovative technology. One may argue that smaller and rural hospitals with limited capacity already have an incentive, since implementing a tele-ICU would open up a revenue stream that was not previously available. The issue then becomes that cost savings and increased profits are not completely guaranteed. While many studies have shown potential, there is still degree of uncertainty, and many smaller hospitals simply cannot take those kinds of risks.

Despite data showing increased profits and decreased costs for a hospital when implementing a tele-ICU, there is risk of potential increased costs (Kumar et al., 2013). In the

study by Kumar et al., they mentioned the possibility of an increase in costs of up to \$5,600 per patient hospitalization, as stated previously. This is enough cause for concern for most healthcare administrators to stand back and wait for further data to come out, confirming cost savings or increases. Losses like this are not sustainable, but the care being provided to an expanded scope of people can be worth the expense. With an added incentive to implement these tele-ICUs, health systems can increase patient access and improve patient care, without worrying about the financial risks, at least for the short term.

4.0 Normative Values and Stakeholder Analysis

4.1 Statement of Values

While considering policy surrounding telehealth and healthcare in general, it is important to examine the normative values associated with the policy debate. Some common values that stakeholders may share include value, bodily autonomy, quality of life, the right to health for all, and more. While not every person in the geopolitical system shares the same values with the same level of intensity, these are fairly applicable for most people involved in this analysis.

Value, bodily autonomy, quality of life, and the right to health for all are values that are important to consider when looking at tele-ICU stakeholders. Value is going to be important for most stakeholders because people often want a service that is worth their money. Individuals, payors, and hospitals likely all want to provide the services with the best value possible. Bodily autonomy is another key value to review. People want to have the right to play a role in the type of care that they receive. While that may not always be possible since it often comes down to what a physician deems as appropriate, it is still going to be a concern that people hold. Another factor that many consider when making any decision about their health is the quality of life the option will provide. This is something that can factor into a physician's decision about a treatment plan and the effects can be felt in both a medical and economical way. Finally, the right to health for all is a highly held value. All people deserve to be treated with the best care possible, and it is important to acknowledge the systemic issues in place and go above and beyond to ensure that all people, no matter their race, age, religion, or ideology are cared for the same. As society continues to strive toward a more just system, this is a value that many stakeholders regard highly.

4.2 Stakeholder Analysis

Values are important to consider when looking to create policy, but it is also important to consider all the necessary parties and their perspectives. As with any issue, multiple stakeholders all have opinions. The main stakeholders involved in telehealth policy, and specifically in tele-ICU reimbursement policy, are the American Medical Association (AMA), the American Nurses Association (ANA), the American Hospital Association (AHA), the American Public Health Association (APHA), technology firms, patients, individual organizations, and potentially more. While it may seem easy to identify the best option, it is important to explore the point of view of each major stakeholder group and understand possible concerns that come with expanding CMS reimbursement for tele-ICUs.

From the provider side, the AMA, ANA, and other provider groups often push for whatever is in the best interest of the patient, but they also must consider what the new policy can mean for themselves. Utilization of tele-ICUs is effective for addressing staffing shortages that are present throughout the country, which might decrease the demand for providers. This would likely affect physicians more so than nurses, and the new expanded policies and incentives could lead to a reduction in how much the members of these groups are paid. The providers may hold the value of the right to healthcare for all highly though which could lead to them being in favor of expanded policy.

Hospitals and the AHA are already strongly in favor of new policy regarding telehealth and incentivization of tele-ICUs. They are strongly in support of increased patient access through high quality care delivered via innovative telehealth solutions. With that, they are pushing for a level of reimbursement that considers nursing and other costs at the originating point of care. They also are in favor of policy that allows for increased funding for research regarding continued cost-

benefit analyses of telehealth (AHA, 2019). Similar to hospitals, the APHA will likely provide support for policy encouraging the expanded access of critical care to all populations, given their mission of ensuring health for all (APHA, 2022) as well as the values previously discussed. One potential area of disagreement the AHA may have is related to liability and the risk that tele-ICUs pose. Individual hospitals will likely be at least somewhat skeptical and want to be certain they have capable technology and protections.

One particularly interesting stakeholder group to consider is “Big Tech” and the technology firms that create many of the tools used in healthcare today. These companies would approve of incentivization for increasing the use of telemedicine in ICUs, but it could go much further than just current monetary considerations. As technology is continuously integrated into healthcare, it creates openings for future tools that have not even been conceived yet. Implementing increased technology use could open the door for much more that is yet to come.

Finally, patients are another stakeholder group to consider. While patients do not typically have much of a say regarding the care they receive in an ICU, if the general public has a strong opinion regarding new policy, it could sway legislators one way or another. Most of the time, people care more about having their life saved in an emergency than how it is saved. The fact that most individuals hold each of the values previously discussed highly though should mean that they favor new policy around this issue. This group of individuals alone will not be likely to play a major role, but they can certainly have an impact in one way or another.

Overall, it will be important to closely monitor the opinions of each stakeholder group. Doing so will allow for understanding concerns and proper foresight into any potential issues. While some stakeholder groups may have the ability to single handedly push legislation and change, most of the time, each group plays a role in the bigger picture as a whole.

5.0 Policy Options Moving Forward

Healthcare in the US will never change completely overnight. It requires an incremental approach. By making slight changes over time, the impact can be felt. Given all the considerations regarding telehealth reimbursement policy and the review of literature, some policy options can be proposed to make an impact moving forward. The main options include permanently extending the CMS COVID-19 telehealth reimbursement policy, ending the COVID-19 telehealth reimbursement policy and returning to a lack of support for tele-ICUs, and providing incentivization to promote the growth of tele-ICUs through a capitation payment.

Permanently extending the CMS COVID-19 telehealth reimbursement policy would provide the opportunity for continued technological innovation and expanded access to care. It may also mean a requirement for more funding to cover the expenses associated with the expanded policy though. This option would receive strong support from many stakeholders like the AHA, APHA, and technology firms. It would create a sense of stability around the issue and allow for continued innovation and expansion of access to care. Reverting the reimbursement policy back to pre-COVID standards will potentially reduce access to care but it will align more closely with the historical standards. Some members of the AMA may agree with this option as it reduces the need to rely on technology for intensive care. Other stakeholders like the AHA, APHA, and technology firms would push back against this though since it is actively reducing the ability currently in place to provide care to so many people. Finally, introducing a new form of a capitation payment to provide additional incentive will cost the government more money initially, but it has the potential to lead to cost savings and expanded access to care for those in rural settings. This option will likely receive the same level of support from all stakeholders as the first option did.

The same people who are in favor of expanding access to tele-ICUs will continue to push for further implementation, while skeptics may opt toward a more conservative approach. Another supplemental policy option may include increasing funding to allow for further evaluation of cost-benefit analyses and additional research on tele-ICUs in general. This is an option that all stakeholders would likely be in favor of. It allows tele-ICUs to continue to prove their efficacy and provide a higher level of confidence to stakeholders in their capabilities.

Despite some of the uncertainty, an abundance of evidence shows support for tele-ICUs. People are more ready now than ever to embrace technology that is integrated into their healthcare. A large number of people were recently introduced to telehealth through virtual visits with their physicians over the pandemic and now it is estimated by McKinsey & Co. that nearly 76% of consumers are interested in utilizing telehealth moving forward (McKinsey, 2021). With that, over half of physicians now feel more comfortable relying on telehealth than before COVID-19 began (McKinsey, 2021). Even though these numbers relate primarily to traditional telehealth from a patient's home, they show that now is the time for this opportunity. This coupled with increased funding for healthcare in the past few years creates the perfect window of opportunity to enact change that has the potential for making a positive impact.

If CMS is not ready to commit to incentivizing tele-ICUs completely, it would be beneficial to at a minimum fund grants for continued research to be done examining the effectiveness of tele-ICUs in rural areas and other areas with disproportionate health disparities. Doing so will address many of the values that each of the stakeholders have, while also being conservative and sticking to what CMS has typically done. Enacting any type of new policy around this issue would be a significant change and it would be a strong step in the right direction.

6.0 Recommendation and Strategies

Tele-ICUs present a potential solution to the modern healthcare problems of provider shortages and access to critical care resources, especially in rural areas. Like any solution though, it comes with a cost. Significant cost barriers have so far led to only health systems in strong financial standing to be able to implement these new units, which itself has continued to widen the health equity gap. Wealthy healthcare systems have the money to be able to provide a higher level of care, which in turn bring in more money and more patients with the ability to pay. This leaves out the small hospitals and health systems in poor and rural areas. These places cannot afford to make a large investment into patient care, so the patients who have no other choice but to go there do not have access to the new innovative care. Then more affluent patients who can afford to travel far distances opt to go to facilities with the better technology and the cycle continues.

Considering the values mentioned previously, the use of tele-ICUs could increase the value of care patients receive and work to reduce some of the health equity gaps in society. As of right now though, tele-ICUs are just not worth it for some hospitals to implement and not doable for others. While many issues like this exist in the United States, this is one that the government can help with and policy change around it will be looked upon favorably by stakeholders. With that though, there are certainly other considerations and comparisons that will be made when deciding between expanding policy around tele-ICUs and other beneficial policies like expanding the availability of primary care and addressing opioid use. These types of things are already being done though. Policy increasing graduate medical education positions to expand primary care in rural and underserved areas has recently been passed by Congress and they are currently looking to do more to address this issue (AAMC, 2021). Grants also continue to be funded for research

involving interventions for opioid misuse. While these issues are slowly being addressed, telehealth reimbursement policy is something that needs to be considered. It requires a minimal level of expansion compared to other policies and works toward the values of many stakeholders across the nation.

By implementing a policy that emphasizes the introduction of more tele-ICUs across the country, quality of care can be improved and total costs can be reduced or profits can be increased. If CMS were to make a few changes to policy regarding telehealth reimbursement, like extending the current emergency reimbursement rules permanently and providing a monthly capitation payment based on the number of tele-ICU beds, it could increase the number of tele-ICUs present in the US, especially in areas that need them most. At a minimum, funding needs to be increased to continue research around the effectiveness of tele-ICUs to confirm the potential for cost savings and the cost-effectiveness of them.

As stated previously, many of the current tele-health reimbursement policies from CMS are in place for the duration of the COVID-19 public health emergency. After it is over, the policies and regulations will revert to previous rules. This uncertainty is likely one of the reasons for not as much investment in tele-ICUs, and lack of reimbursement is mentioned in many of the discussion sections of papers cited above. If CMS announced new long term telehealth reimbursement policies, it could provide more stability and encourage executives to feel confident in a decision to invest. Another way that leaders can be persuaded to implement these units is to provide a new monthly capitation payment, in addition to current reimbursement, based on geography, utilization, and the number of new tele-ICU beds. Doing so has the potential to be beneficial for hospitals if they can reduce costs and improve patient outcomes in ways like those mentioned in the literature review above. It also creates a more predictable stream of revenue that

aids in avoiding potential losses from first year costs. A potential negative associated with capitation payments could be that providers try to get as many patients into the beds as possible and sacrifice the quality of care. Therefore, there would also need to be a quality-based metric associated with the payments. Capitation payments were often utilized in the 1990s and ended up tailing off in popularity, but this could be a useful application of them. Overall, utilizing this system monthly to cover some of the initial costs of developing a tele-ICU could be very beneficial. In addition, policy should be included that limits the number of beds a single tele-ICU provider can monitor in the central command room. This will ensure a higher level of safety and potentially make people feel even safer.

While clear benefits come with implementing a tele-ICU, others are not as obvious. When a hospital decides to implement a tele-ICU, a number of benefits will be felt across the location by the hospital staff. Along with the likelihood of improved patient care and profitability, charging and billing abilities are likely to improve. The capability of constantly monitoring every aspect of a patient's care with a high degree of accuracy brings about an opportunity to ensure proper and accurate billing for all patients. If everything is monitored and reported perfectly, it allows for more extensive billing options for the revenue cycle staff and can offset some of the costs brought about by the new technology, as long as the services are generally covered.

The reduced mortality and ALOS metrics mentioned in the literature review above are features associated with tele-ICUs that are important to people. They can bring about value, increased quality of life, and improved access to health for all, if implemented properly. Addressing these values that stakeholders have with expanded policy will be important moving forward in public health and doing so should be made a priority.

7.0 Discussion

7.1 Future Public Health Implications

Implementing policy that encourages tele-ICUs can result in many of the new benefits mentioned, but one of the most important benefits is the role it will play in health equity. The US healthcare system is broken in many ways including how much care costs, who has access to what care, the poor outcomes that certain demographics have, and more. Perhaps the most notable way is the difference in care that more affluent individuals receive compared to those who may be lacking financial resources. If a reimbursement policy encourages the implementation of tele-ICUs, and tele-ICUs continue to prove effective, people of all socio-economic backgrounds can receive top-notch care, rather than only those who can afford it and live in more affluent areas of the country.

Another future direction is the use of insurance policy around long-term home-based telehealth. As time goes on, it grows more likely that payors will eventually stop paying for hospital readmissions. With that, it may be important to consider how CMS policies around that type of care can be used to make the greatest impact. Doing so may allow for RPM to move from a tele-ICU to a patient's home, without as much of a risk for readmission. This can potentially improve patient satisfaction while also reducing the cost burden that CMS faces, especially with the Medicare population.

One final future consideration to make in conjunction with telehealth policy is to indefinitely extend the currently lifted requirement of a state license for a physician to practice telemedicine. Doing so would further enhance access to care for those in rural areas and play a

role in the future of addressing the physician shortage issues. It would also further increase the appeal of the implementation of tele-ICUs, given the improved flexibility.

7.2 Limitations

This paper has discussed relevant research and health policy principles associated with tele-ICUs. While it does touch on each of the major pieces around tele-ICU policy, there are some limitations that come with it. Some of the limitations include a lack of available data around the impact of tele-ICUs on expanding access and aiding in health equity, how quickly technology changes, a lack of recent studies in general, and a lack of research with consistent findings. Each of these factors is important to consider when thinking about the policy analysis as a whole.

Health equity and access to care are important and should be pieces of any major analysis. In this situation, one can picture how impactful tele-ICUs can be at improving them, as detailed earlier. A major issue though is that there is a lack of data currently available showing this impact. Without proper research and data visualizations available to aid people in understanding how tele-ICUs can help, it can be challenging to see the whole situation. Changes in technology are also a limitation of this paper. Technology is a field that changes rapidly, especially with regard to its application in healthcare. In just a few years, standards can change and new best practices can become available. This can lead to a change in the expected costs associated with technology. These changing standards and new technologies can also improve the quality of care that tele-ICUs are able to provide. When combining this with the lack of recent studies, it can be difficult to show the effect that tele-ICUs are currently having and make the most compelling analysis. The major limitation of this paper is the lack of consistent research confirming the impacts that tele-

ICUs can have. There have been examples of how impactful tele-ICUs can be throughout the paper, but there is a need for further research given the previous studies that also show no significant impact.

One final limitation that is important to give consideration to is that there has not been any major research to come out of the COVID-19 pandemic yet regarding tele-ICU intervention. Since the pandemic has only recently begun to recede, there has not been enough time to show some of the actual effects of interventions utilized. Once some of this research is able to come out, there could be even more factual backing to the effectiveness of tele-ICUs due to their role in treating COVID-19 patients, in addition to the research mentioned previously. If the findings of these studies are positive, there should be even more reasoning for expanding reimbursement policy.

8.0 Conclusions

Millions of people ask the question every day, “How can the US improve the healthcare system?” When a solution is as available, reasonable, and timely as telehealth, it must be fully leveraged and utilized. Something that has the potential to reduce costs, take the burden off providers, and improve the quality of care people receive should be given a chance to flourish. Physician burnout rates had been high for years before the pandemic, and they have only continued to skyrocket. Leveraging telehealth to provide care for patients reduces the need for as many on-site providers and allows for much more of a work-life balance for physicians. Tele-ICUs also have the ability to reduce costs to payors and reduce important hospital metrics like ALOS and mortality. This can in turn reduce costs for hospitals and increase patient volumes and hospital profits.

The quality of care provided by tele-ICUs has been shown to be at the same level as, if not higher than, traditional ICU care. Besides the fact these sites allow for constant direct patient monitoring, this technology expands access to areas that simply do not have the number of specialty physicians needed to provide adequate care. By providing a tele-ICU option, the level of care many receive will be improved. Tele-ICUs may not always be perfect, and they may not always be able to prove a reduction in various hospital metrics, but it is clear that they provide a level of care comparable to the current model, and they do so while also providing the healthcare system with a lot more flexibility.

After consideration of all the facts, capabilities, and implications of tele-ICUs, reimbursement policy for telehealth should be extended past the pandemic and monthly capitation payments based on geography and utilization should be distributed on a per tele-ICU bed basis.

Tele-ICUs can provide a high-level quality of care, often reduce costs, and allow for expanded access into areas that had not formerly had the capabilities. Expanding compensation will provide a much-needed incentive for smaller and less wealthy health systems to invest in telehealth, drastically changing the future of healthcare.

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